

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Narthecium americanum*

COMMON NAME: Bog Asphodel

LEAD REGION: Region 5

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition requesting a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, emergency listings, and essential litigation-related, administrative, and program management functions. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

☐ Listing priority change

Former LP: ☐

New LP: ☐

Date when the species first became a Candidate (as currently defined): 1990

☐ Candidate removal: Former LP: ☐

☐ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or

continuance of candidate status.

- ☐ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- ☐ F – Range is no longer a U.S. territory.
- ☐ I – Insufficient information exists on biological vulnerability and threats to support listing.
- ☐ M – Taxon mistakenly included in past notice of review.
- ☐ N – Taxon does not meet the Act’s definition of “species.”
- ☐ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Liliaceae (Lily)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: NJ, NY, DE, NC, SC

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: NJ

LAND OWNERSHIP:

Of the 53 known extant populations of bog asphodel, 37 occur on State-owned lands, 2 occur on federally owned lands, and 14 occur on private lands. State-owned lands include Brenden Byrne State Forest, Penn State Forest, Wharton State Forest, and Bass River State Forest. Federally owned lands include Edwin B. Forsythe National Wildlife Refuge and Warren Grove Gunnery Range. We anticipate that there are more sites on private lands that have not been reported.

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LEAD FIELD OFFICE CONTACT: New Jersey Field Office, Annette Scherer, 609-383-3938 ext 34; [annette\\_scherer@fws.gov](mailto:annette_scherer@fws.gov)

BIOLOGICAL INFORMATION:

### Species Description

Bog asphodel is a perennial herb that grows 25-40 centimeters (cm) high and has basal leaves 10-20 cm long that extend from slender underground rhizomes. The basal leaves are narrow (1-2 millimeters (mm) (Gleason and Cronquist, 1991); 1.5-3.0 mm (Radford *et al.*, 1968); 2-5 mm (U.S. Fish and Wildlife Service, 2002)), con-duplicate (enfolded lengthwise), stiff, and with parallel veins (7-9 nerves). Culm leaves are few and greatly reduced in length. A dense raceme (2-5 cm long) of small, showy, bright-yellow flowers tops the simple, erect flowering culm from late June through July. Each flower is made up of six tepals that persist around the fruit (capsule), six stamens with filaments half as long as the tepals, and a superior ovary with a minutely three-lobed stigma. The perianth, raceme, and flowering culm are long-persisting. Capsules are long-pointed, reddish-brown (up to 14 mm long). Seeds are pale yellow, fusiform

and long-pointed (Fernald, 1950; Radford *et al.*, 1968; Schuyler, 1990; Gleason and Cronquist, 1991).

### Taxonomy

Bog asphodel was historically and scientifically known by the synonyms *Abama montana* Small, *Abama americana* (Ker-Gawler) Morong, and *Nartheceum ossifragum* (L.) Huds. variety *americanum* (Ker-Gawler) Gray (Stone, 1911; Fernald, 1950; Radford *et al.*, 1968; Gleason and Cronquist, 1991; Natural Resources Conservation Service, 1999). *Nartheceum californicum* Baker is the only other species within this genus in the United States (Natural Resources Conservation Service, 1999). The generic name comes from the Greek *nartheceion*, meaning a chest or box to store ointments (Fernald, 1950), likely referring to the capsule's shape. A common name synonym is yellow asphodel (Fernald, 1950; Natural Resources Conservation Service, 1999). The Service has carefully reviewed the available taxonomic information and has concluded the species is a valid taxon.

### Habitat

The bog asphodel is found in savannah areas, usually with water moving through the substrate, as well as sandy bogs along streams and rivers (Stone, 1911; Fernald, 1950; Radford *et al.*, 1968; Schuyler, 1990; Gleason and Cronquist, 1991). In the New Jersey Pinelands, savannahs are found adjacent to rivers and creeks, often separated by a wooded levee and bordered by an Atlantic white-cedar (*Chamaecyparis thyoides*) swamp. Micro-habitats include open bogs surrounded by Atlantic white-cedar, lowlands near sharp river bends and oxbow meanders, *Sphagnum* bogs, iron ore streamlet seeps, small mat hummocks, quaking bogs, mud flats, sunny borders with Atlantic white-cedar swamps, and transitional areas (ecotones) (Radis, 1993; Dodds, 1996; Dodds and Goodwin, 1997). This plant is intolerant of full-shade, and is vulnerable to alterations or succession of its habitat. The growth of woody vegetation in savannah communities occupied by bog asphodel is most likely suppressed by substrates of iron ore deposits and by intermittent flooding from adjacent rivers and creeks (Cartica, 1999).

### Historical Range/Distribution

The historic range of bog asphodel included New York, New Jersey, Delaware, North Carolina, and South Carolina.

### Current Range/Distribution

Now extant only within the Pine Barrens region of New Jersey.

### Population Estimates/Status

The New Jersey Natural Heritage Database currently contains records for 66 occurrences (43

extant, 23 historical) of bog asphodel. Approximately 10 additional extant sites were identified in 1999 and 2000 that have not been thoroughly surveyed and do not yet appear in the Heritage Database (Popolizio, 2002; Gordon, 2002). (when were these identified? Any citation?).

#### THREATS:

##### A. The present or threatened destruction, modification, or curtailment of its habitat or range.

As an obligate wetland species, *N. americanum* is threatened by changes in hydrology, loss of habitat due to filling or draining of wetlands, flooding as a result of reservoir construction, and conversion of natural wetlands to commercial cranberry bogs. This species occurs in the Pine Barrens region and the Pinelands Commission issues the State assumed Clean Water Act, Section 404 permits. The Pinelands Commission grants wetland exemption to cranberry production and other agricultural uses. Illegal wetland filling is occurring. For example, cranberry expansion was illegally completed in the 1990's without state permits. In addition, activities not needing State or federal permits are occurring in uplands that are indirectly affecting the wetlands by causing erosion, sedimentation, and hydrological alterations (changes in water quality and quantity). New Jersey is the most densely populated State in the Nation and is experiencing increased demand for residential housing. During the period of 1990 to 2000, counties supporting populations of bog asphodel experienced increased population growth of between 7.2 and 17.9 percent (U.S. Census Bureau, 2004). Funding to support conservation activities on the Wharton State Forest has ended. The State will no longer be implementing conservation activities within the forest.

##### B. Overutilization for commercial, recreational, scientific, or educational purposes.

Within the 1980s and 1990s several easily accessible *N. americanum* sites known to be popular with botanists have experienced severe declines from over-collection (New Jersey Natural Heritage Biological and Conservation Database, 2004). Additionally, recreationists picking wildflowers are drawn to the attractive flowers and seedpods of *N. americanum*, leading to declines in areas visible from trails, roadways, and streams (Cartica, 1995a).

##### C. Disease or predation.

Deer and geese are known to occasionally crop some of the flowering culms. These instances cannot be considered major threats to bog asphodel, although they have been reported occasionally. Deer forage in bog asphodel habitat quite extensively, and in drought years, the deer most likely will forage on bog asphodel. Seed predation by long-horned grasshoppers has been documented, although little is known about the frequency and intensity of this predation on bog asphodel capsules. No other diseases or predators are known to adversely affect bog asphodel populations.

##### D. The inadequacy of existing regulatory mechanisms.

Existing regulations provide limited protection from direct on-site habitat loss and degradation,

but do not provide protection from off-site threats that degrade wetland habitats (*i.e.*, non point-source pollution, siltation; groundwater withdrawal from private wells). Activities occurring in uplands are not necessarily regulated, but are indirectly affecting the wetlands. New Jersey's Endangered Plant Species List Act (NJAC 7:5C) lists *N. americanum* as endangered, but does not provide regulatory protection from collection or habitat loss. The Pinelands Protection Act (NJSA 13:18-1 et. seq.) allows some cranberry agricultural practices that present a major threat to *N. americanum* habitat.

E. Other natural or manmade factors affecting its continued existence.

Succession and beaver-induced flooding of *N. americanum* habitat are natural threats to the species. Conversely, beaver have been providing hydrological support for bog asphodel habitat at one site on the Batsto River and one site on the Oswego River. Natural succession of vegetation in wetlands supporting bog asphodel from emergent (herbaceous) to forested wetlands may be contributing to the species decline. Suppression of natural wildfires that would retard succession or create open wetland savannahs is a factor in the decline of the species. Summary reports from the State provide evidence that other factors adversely affecting *N. americanum* include trampling, erosion, and siltation caused by recreationists on foot or using off-road vehicles (Radis, 1993; Cartica, 1995a).

## CONSERVATION MEASURES PLANNED OR IMPLEMENTED

A Candidate Conservation Agreement was signed in November 2002 that covers 33 bog asphodel sites occurring within Wharton State Forest, New Jersey. This conservation agreement provides guidance to New Jersey Department of Parks and Forestry land managers to ensure the conservation, protection, and survival of bog asphodel within Wharton State Forest.

With the Service's support, New Jersey Department of Parks and Forestry produced a comprehensive series of publications on population surveys for bog asphodel, namely Windish (1993) for West Branch Wading River and Oswego River corridors; Hill (1993) for Wharton and Lebanon State Forests; Radis (1993) for the Batsto River corridor, Wharton State Forest; and Gordon (1996) for Atlantic and Burlington Counties. Schuyler (1995) surveyed historical and known bog asphodel populations on private lands. Moreover, New Jersey Department of Parks and Forestry produced the confidential *Handbook of Narthecium americanum Populations on State Owned and Managed Lands*, summarizing site-specific survey results, potential threats, and preliminary management recommendations (Cartica, 1995b).

Also with the Service's support, New Jersey Department of Parks and Forestry published the results of an investigation on hydrology and succession at ten sites populated with bog asphodel (Dodds, 1996) and revised the boundary of Batsto Natural Area within Wharton State Forest, incorporating approximately 62 percent of bog asphodel's known global occurrences into the new boundary and providing bog asphodel with the most protective designation available for State-owned conservation lands (Cartica, 1996). However, without adequate funding, active management on State lands will not occur. Plans for active management of bog asphodel, as well as conservation plans and enhancement measures for bog asphodel populations on State -

owned lands were prepared by Dodds (1997a; 1997b), Dodds and Cartica (1997), and Dodds and Goodwin (1997). More recently, *de novo* surveys were conducted in suitable areas identified through use of Geographic Information System technology to locate potential habitat for bog asphodel in areas that had not been surveyed in the past (Breden *et al.*, 1998). The surveys resulted in the discovery of a new bog asphodel population consisting of a few thousand individuals.

#### SUMMARY OF THREATS

Habitat degradation or loss from changes in hydrology, filling or draining of wetlands, reservoir construction, and conversion of natural wetlands to commercial cranberry bogs remain the major threats to *Narthecium americanum*. Another major threat is the lack of regulatory protection from collection or habitat loss. Browsing on the flowering culms by deer and geese and seed predation by insects are minor threats to this species. Recreation, erosion, siltation on State owned lands is a significant threat to the species' habitat. Fire suppression that would retard succession or create open wetland savannahs can also be factored into the decline of the species.

For species that are being removed from candidate status:

\_\_\_ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

#### RECOMMENDED CONSERVATION MEASURES:

- Pursue landowner protection agreements.
- Identify hydrologic needs of species and develop recommendations for establishing protective buffers around wetland habitats supporting the species.

#### LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
<b>Moderate to Low</b>	<b>Imminent</b>	Monotypic genus	7
		<b>Species</b>	8*
		Subspecies/population	9
	Non-imminent	Monotypic genus	10

		Species	11
		Subspecies/population	12

**Rationale for listing priority number:**

*Magnitude:*

Approximately 70 percent of known extant populations occur on State-owned lands. The U.S. Fish and Wildlife Service is working with the New Jersey Department of Environmental Protection to abate known moderate threats at these sites from recreational use and erosion.

Approximately 30 percent of the known extant sites are on privately-owned lands, many of which are threatened by habitat degradation from on-site or adjacent residential or commercial development. New Jersey wetland protection regulations are not sufficient to prevent all habitat degradation occurring in wetlands supporting bog asphodel, but are sufficient to reduce the level of habitat degradation to a moderate threat level. Degradation of bog asphodel habitats on privately-owned lands associated with residential and commercial development would represent a permanent loss of the species habitat.

*Imminence:*

The major threat to the bog asphodel is from habitat degradation due to recreation, erosion, and siltation on State-owned lands and residential and commercial development on and adjacent to wetlands supporting bog asphodel on privately owned lands. These impacts are currently occurring and can be expected to continue.

Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Is Emergency Listing Warranted? Based on the best available scientific information emergency listing is not warranted at this time.

**DESCRIPTION OF MONITORING:**

Information regarding the status of the species is being monitored through review of any changes in information within the New Jersey Natural Heritage Database and through coordination with New Jersey Natural Heritage Program staff, species experts, and environmental consultants. Most extant bog asphodel sites have not been monitored for more than 5 years due to insufficient staff and funding at both the State and federal levels.

This level of monitoring is not appropriate to provide an adequate current status update given the threats to the species, especially from degradation of the species wetland habitats.

**COORDINATION WITH STATES**

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: New Jersey, Delaware, and North Carolina

Indicate which State(s) did not provide any information or comments: N/A

#### LITERATURE CITED

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Division of Parks and Forestry, Trenton, New Jersey. 55 pp. + Appendices

Radis, R.P. 1993. Survey of populations of the bog asphodel (*Narthecium americanum*) in the Batsto River corridor, Wharton State Forest, Burlington, County, New Jersey. Report prepared for the New Jersey Department of Environmental Protection, Division of Parks and Forestry, Office of Natural Lands Management, Trenton, New Jersey. 10 pp.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. The University of North Carolina Press, Chapel Hill, North Carolina. 1183 pp.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Richard O. Bennett 11/7/2005  
Regional Director, Fish and Wildlife Service Date



Concur: \_\_\_\_\_ August 23, 2006  
Director, Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Date of annual review: October 3, 2005  
Conducted by: Lisa Arroyo/Annette Scherer, New Jersey Field Office